

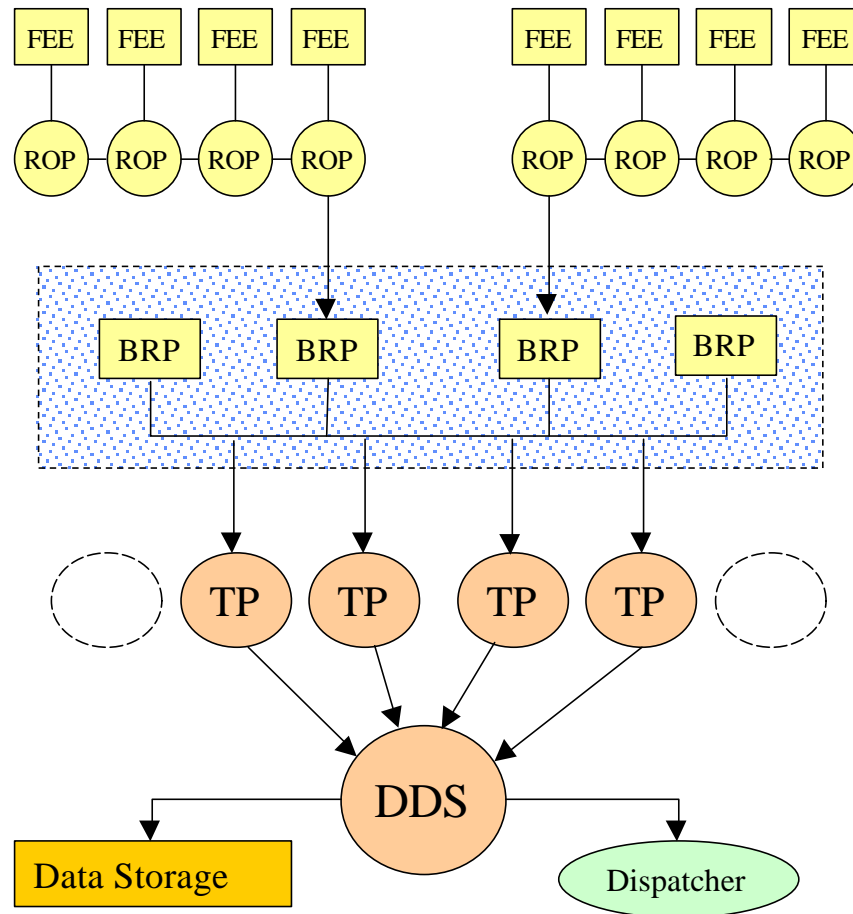


DAQ Readout & Transfer

Data Flow
Data Assembly
Front-end readout
BRPs & Run Control
Trigger Farm
DDS
Online Management



Data Flow

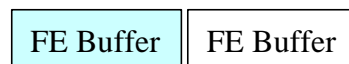


- FE Digitises & Timestamps Hits Continuously
- ROP buffers Hits in synchronous Time Blocks and forms Time Frames
- Readout by BRPs and assembled into longer Time Frames
- Passed to Trigger Farm for Event Selection
- Events found in Farm Trigger transmitted for analysis & storage



Data Assembly

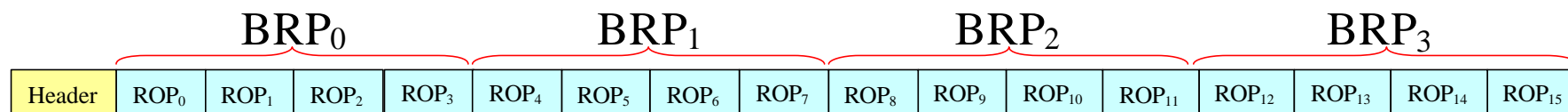
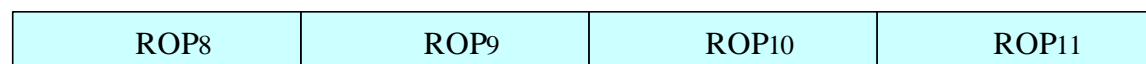
FEE



ROP



BRP

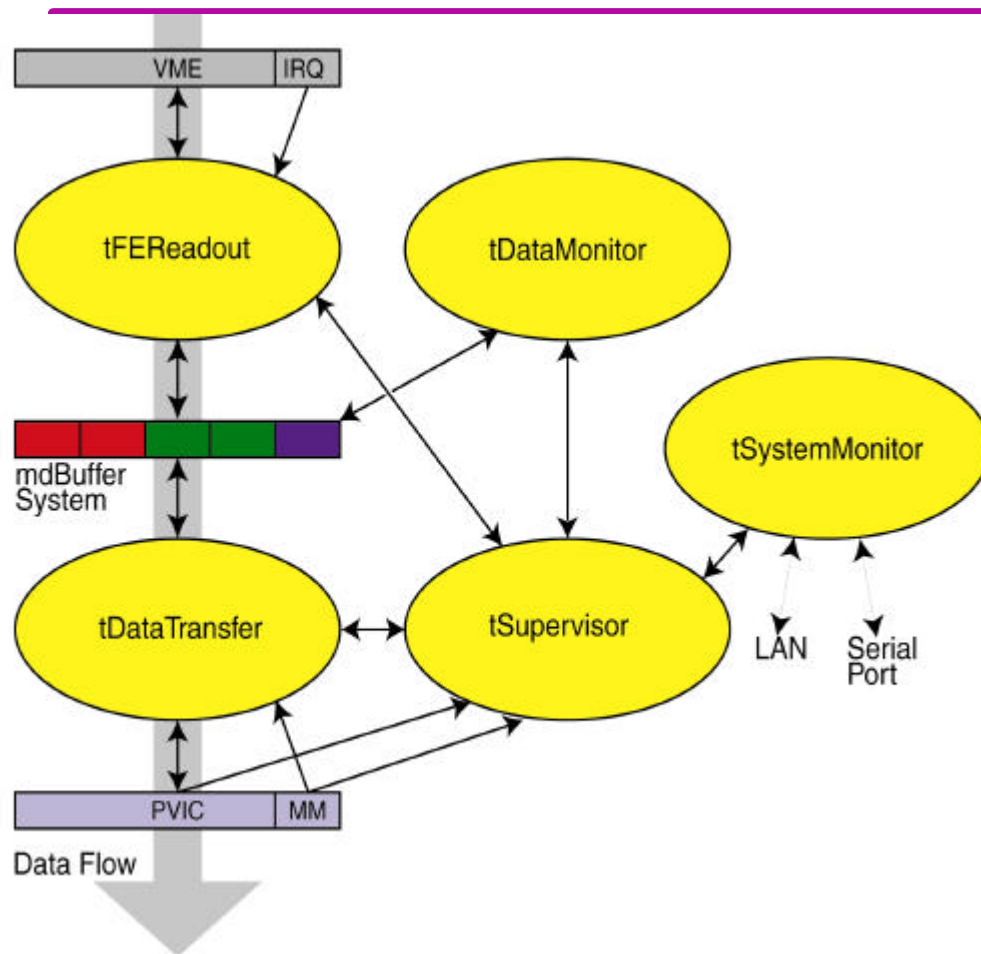


TP / DDS





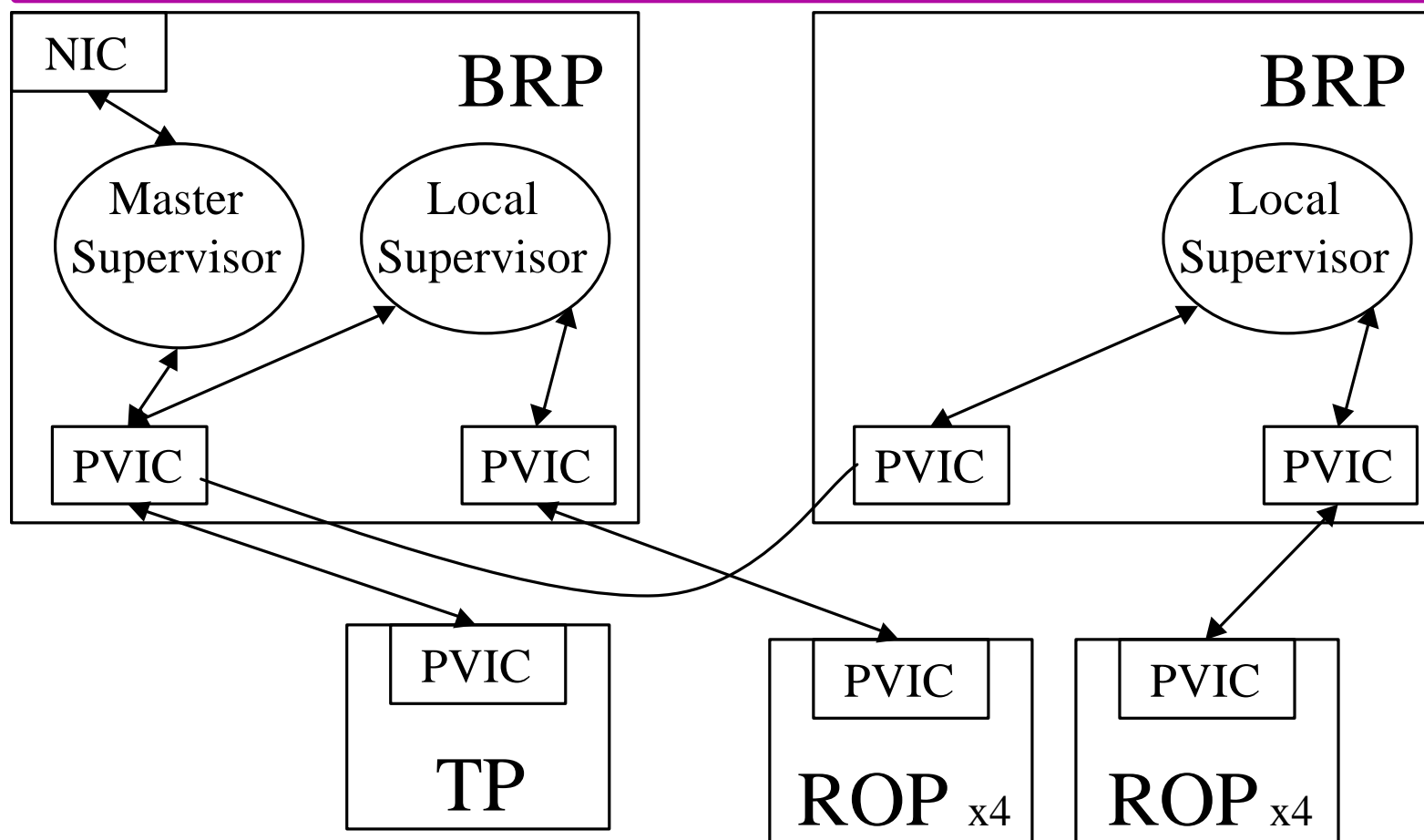
Front-end Readout



- VME interrupt generated by Timing system
- Interrupt triggered FE buffer readout
- Time Blocks ~ 10ms (programmable)
- ROP Buffer system makes Time Frames ~ 1s (progr.)
- Data and system monitor
- TF request via PVIC mm
- Common source for FE & ROP - synchronised

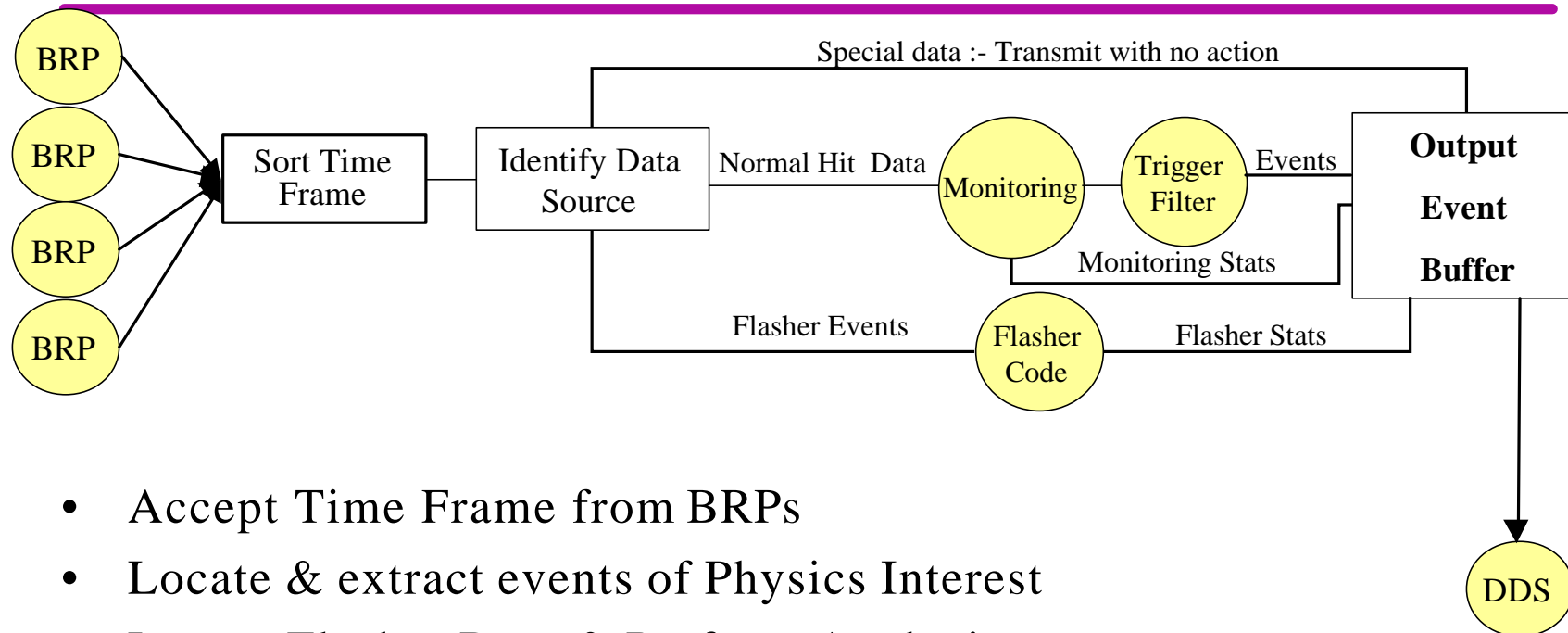


BRPs & Run Control





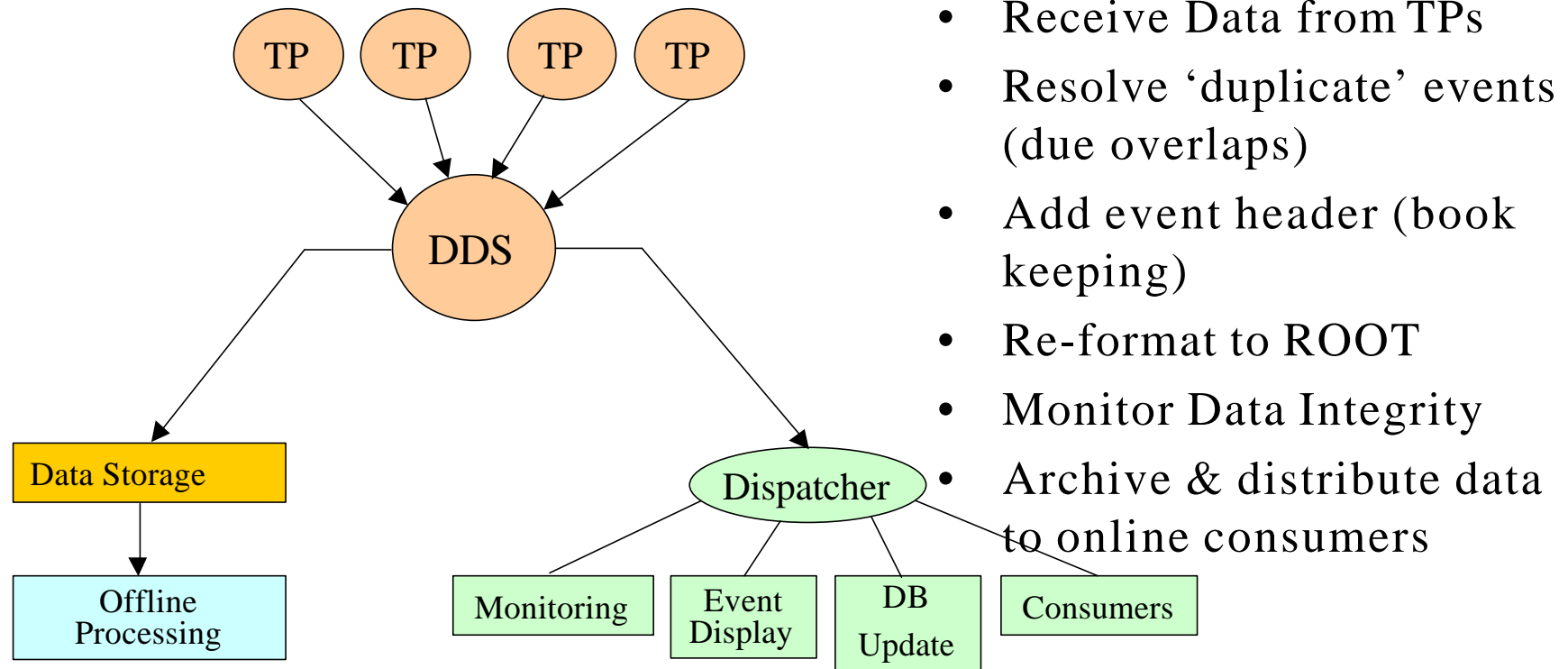
Trigger Farm



- Accept Time Frame from BRPs
- Locate & extract events of Physics Interest
- Locate Flasher Data & Perform Analysis
- Accumulate Monitoring Statistics
- Transmit any special data directly
- Transmit Events to DDS

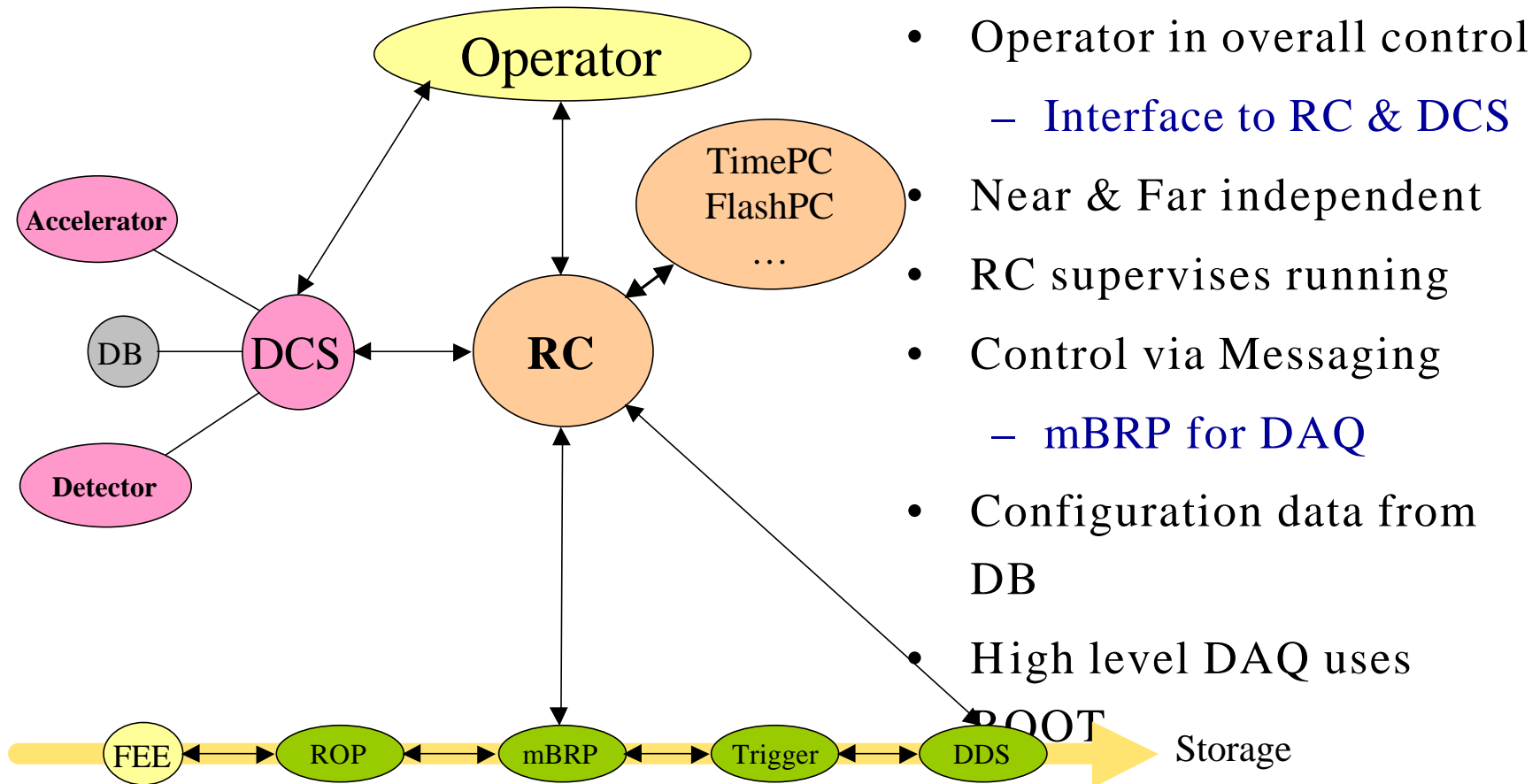


Data Distribution System





Online Management





DAQ Vertical slice

Come and see it after lunch !



Run Control & Monitoring

- RCM issues high level control instructions to mBRP
- mBRP responsible for detailed implementation
- Run time configurations sent with control instructions
- RCM accepts monitoring data
 - mBRP monitors DAQ state
 - DDS monitors data integrity
- RCM acts on monitoring information & displays to operator



Run Control & Monitoring

- RCM has overall supervisory responsibility for running MINOS
 - RCM is the MINOS run supervisor
 - Sole point of contact between DCS & DAQ - Operator & DAQ
 - DCS supervises detector control/ configuration
 - High level instructions from RCM
 - RCM notified of faults - details from DCS
 - DCS supplies DAQ/ FEE configuration Data
 - RCM distributes configuration to FEE & DAQ
 - RCM executes state transitions



Readout Control

- FE read out by ROP at interrupts from TimePC via VME
- mBRP initiates BRPs via PVIC to
 - read out TF from ROPs
 - transfer TF to available TPs
- TP is read out by DDS



Systems Communication

- ROP <-> GPS-PC (16..1) Serial
- MBRP <-> ROP (1..16) PVIC
- MBRP <-> BRP (1..4) PVIC
- MBRP <-> RC (1..1) LAN
- MBRP <-> TP (1..16) PVIC
- MBRP <-> FlashPC (1..1) LAN
- MBRP <-> TimePC (1..1) LAN



Rates

Component	Near	Far	Comments
Worst case detector rate	2.5 MHz	5 MHz	
Hit data size	16 bytes	8 bytes	
Detector data	40 Mbytes/s	40 Mbytes/s	
Readout crate rate	2.5 Mbytes/s	2.5 Mbytes/s	1 out of 16 in total
Network data rate	10 Mbytes/s	10 Mbytes/s	1 out of 4 in total
Farm data rates	40 Mbytes/s	40 Mbytes/s	
Farm processor rate	8 Mbytes/s	8 Mbytes/s	1 out of 5 used

- Based on
 - Worst case design figure of 212 Hz per pixel
 - 23K Far Detector Channels
 - 11k Near Detector Channels
 - 8 Byte Hits Far Detector
 - 16 Byte Hits Near Detector